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Rheology and wettability control of polymer solutions based on polyacrylamide in enhanced oil recovery

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Abstract

© SGEM 2017. All Rights Reserved. The current hard-to-recover oil reserves in Russia stand for more than 60% of total recoverable oil resources. These kind of reservoirs with acceptable technical and economic indicators are extracted only by applying physicochemical recovery techniques. Thus, an important relevance is given to selection of most effective EOR technology, which is directed to decrease the residual oil saturation in rock formations. Various chemical reagents including composites based on water-soluble polymers are injected both in Russia and worldwide in order to maintain reservoir pressure and to increase the oil recovery factor. The water-soluble polymers decrease the mobility difference between displacing and displaced fluids, reducing fingering effects. At the result of late water breakthrough oil recovery increases. It is highly important to introduce the model of rock matrices in order to combine the known phenomenon of natural chromatographic separation in reservoir rocks, which is characterized by heterogeneity of permeable rocks. Accordingly, heavy crude oil are located in large pores, as well as in small pores concentrated hydrocarbons. Therefore, the amount of hydrocarbon content describes the hydrophobic parameters. In this study, we combined the composite polymers with polydisperse rocks like calcite and dolomite. The different experimental results gained from using various types of rock, which is due to pore morphology and molecular interactions of polymers with rock surfaces. New laboratory results of processes, which are carried on interphase of a system: fluid reservoir - mineral matrix, are discussed..

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Keywords

Contact angle, Heavy crude oil, Polymer flooding, Rheology, Wettability

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